

This listing of claims will replace all prior versions, and listings of claims in the subject patent application as follows:

Listing of Claims:

1-21. (Previously Cancelled)

22. (Withdrawn) Apparatus for cleaning or de-icing a vehicle window, comprising:
 a reservoir for containing therein a washing fluid;
 a vessel having an inlet through which the washing fluid is received from the
reservoir and an outlet through which the fluid is discharged for cleaning a vehicle window; and
 characterized by
 further comprising a fluid authorization system for verifying use of an authorized
fluid.

23-29. (Previously Cancelled)

30. (Previously Amended) Apparatus for cleaning or de-icing a vehicle window, comprising:
 a reservoir for containing therein a washing fluid;
 a vessel having an inlet through which the washing fluid is received from the
reservoir and an outlet through which the fluid is discharged for cleaning a vehicle window;
 a heating element disposed in the vessel for heating the fluid in the vessel; and
 apparatus to prevent damage due to freezing of the fluid.

31. (Original) Apparatus according to claim 30 wherein said apparatus to prevent damage comprises a platform arranged for sliding in said vessel, said platform being operative to slide due to a force of said fluid pressing thereagainst during freezing of said fluid.

32. (Original) Apparatus according to claim 30 wherein said apparatus to prevent damage comprises a cap attached to said vessel and which is operative to move away from said vessel due to a force of said fluid pressing thereagainst during freezing of said fluid.

33. (Withdrawn) Apparatus for cleaning or de-icing a vehicle window, comprising:
a reservoir for containing therein a washing fluid;
a vessel having an inlet through which the washing fluid is received from the reservoir and an outlet through which the fluid is discharged for cleaning a vehicle window; and
a heating element disposed in the vessel for heating the fluid in the vessel; and
apparatus for shutting off electrical supply to said heating element.

34. (Withdrawn) Apparatus according to claim 33 wherein said apparatus for shutting off electrical supply comprises a fuse electrically connected to said heating element.

35. (Withdrawn) Apparatus according to claim 34 wherein said fuse is internal to said vessel and is in contact with said washing fluid in said vessel.

36. (Withdrawn) Apparatus according to claim 34 wherein said fuse comprises a body to which is soldered a cap portion at a soldered connection, said cap portion being biased by a biasing device, said fuse being electrically connected to said heating element through said

soldered connection, wherein upon reaching a predetermined temperature, said soldered connection becomes weakened due to at least partial melting thereof, and said biasing device urges said cap portion off said body, thereby causing a break in electrical supply to said heating element.

37. (Withdrawn) Apparatus according to claim 34 wherein said fuse is mounted on a base which is sealed with respect to said vessel by means of an endcap which presses said base against an O-ring mounted on said vessel.

38. (Withdrawn) Apparatus according to claim 33 wherein said apparatus for shutting off electrical supply comprises a fuse which is physically internal to and electrically connected to said heating element.

39. (Withdrawn) Apparatus according to claim 33 wherein said apparatus for shutting off electrical supply comprises a first FET in electrical communication with said controller, a fuse external to said vessel and operatively connected to said first FET, a second FET operatively connected to said fuse, said second FET in communication with at least one of said temperature sensor, a thermostat mounted in said vessel, and logic circuitry in electrical communication with said second FET.

40. (Withdrawn) Apparatus according to claim 39 wherein if no command signal is sent to said first FET from said controller, said first FET is open and said heating element is not energized.

41. (Withdrawn) Apparatus according to claim 39 wherein if a command signal is sent to said first FET from said controller, said first FET is closed and said heating element is energized.

42. (Withdrawn) Apparatus according to claim 39 wherein if no command signal is sent to said first FET from said controller, but a near zero voltage drop exists across said first FET, then said second FET is commanded to close, thereby sending a current through said fuse which breaks said fuse and disconnects electrical supply to said heating element.

43. (Withdrawn) Apparatus according to claim 39 wherein if a command signal is sent to said first FET from said controller, but a voltage drop generally greater than zero exists across said first FET, then said apparatus for cleaning or de-icing a vehicle window is commanded to shut down.

44. (Previously Amended) Apparatus for cleaning or de-icing a vehicle window, comprising:
a reservoir for containing therein a washing fluid;
a vessel having an inlet through which the washing fluid is received from the reservoir and an outlet through which the fluid is discharged for cleaning a vehicle window; and
a heating element disposed in the vessel for heating the fluid in the vessel; and
a solenoid in direct electrical communication with a control circuit printed circuit board (PCB) mounted in said vessel, said solenoid determining whether said fluid flows directly to said spray head or flows to said spray head via said vessel.

45. (Original) Apparatus according to claim 44 wherein said solenoid is attached to said PCB.

46. (Original) Apparatus according to claim 44 wherein said PCB is selectively connectable to a vehicle computer, wherein operation of said solenoid and said apparatus for cleaning or de-icing a vehicle window is controllable by at least one of said PCB and said vehicle computer.

47. (Withdrawn) Apparatus for cleaning or de-icing a vehicle window, comprising:

a reservoir for containing therein a washing fluid;

a vessel having an inlet through which the washing fluid is received from the reservoir and an outlet through which the fluid is discharged for cleaning a vehicle window; and

a first heating element disposed in the vessel for heating the fluid in the vessel;

and

a pumping system in fluid communication with said reservoir and said vessel which selectively pumps fluid from said reservoir to said vessel and drains said fluid from said vessel back to said reservoir;

wherein said pumping system comprises a reversible pump which in a first operating orientation pumps said fluid from said reservoir to said vessel and in a second operating orientation pumps said fluid from said vessel back to said reservoir and in a third operating orientation wherein said pumping system is stopped while the fluid is still flowing towards said vessel, and only after a delay, the fluid is re-routed from a direction towards said vessel to a direction away from said vessel.

48. (Previously Added) Apparatus for cleaning or de-icing a vehicle window comprising:

a reservoir for containing therein a washing fluid;

a vessel having an inlet through which the washing fluid is received from the reservoir and an outlet through which the fluid is discharged onto a vehicle window;

a heating element for heating the fluid in the vessel; and

a heating and fluid discharge controller having the following functionality for a sequence of fluid heating and discharge cycles:

initially heating an initial quantity of said fluid in said vessel to a first target temperature, at which temperature the initial quantity of fluid in said vessel is discharged and a further quantity of fluid is supplied to said vessel;

heating said further quantity of said fluid to a second target temperature at which temperature the further quantity of said fluid in said vessel is discharged and a still further quantity of fluid is supplied to said vessel; and

operating said heating element in said vessel substantially continuously throughout the sequence.

49. (Previously Added) Apparatus according to claim 48 and wherein said heating and fluid discharge controller is operator actuable.

50. (Previously Added) Apparatus according to claim 48 and wherein said heating and fluid discharge controller drives a pump which supplies said fluid to said vessel and causes discharge of said fluid from said vessel.

51. (Previously Added) Apparatus according to claim 50 and wherein said pump is also operative for spraying fluid directly from said reservoir onto said windshield.

52. (Previously Added) Apparatus according to claim 48 and also comprising a fuse disposed in said vessel and exposed to said fluid, said fuse being electrically connected with said heating

element and being operative to disconnect said heating element from electrical power when insufficient fluid is located within said vessel.

53. (Previously Added) Apparatus according to claim 48 and wherein said vessel comprises an inner chamber in which said heating element is located, said inner chamber being surrounded by an outer chamber and communicating therewith via a plurality of apertures at various levels.

54. (Previously Added) Apparatus according to claim 48 and wherein said heating and fluid discharge controller also has the following functionality:

discharging fluid onto a vehicle window from said reservoir via a bypass line when a spray is needed immediately and there is insufficient time to heat the fluid.

55. (Previously Added) Apparatus according to claim 48 and also comprising at least one temperature sensor associated with said vessel for providing temperature inputs to said heating and fluid discharge controller.

56. (Previously Added) Apparatus according to claim 55 and wherein said at least one temperature sensor comprises first and second temperature sensors located at different locations with respect to said vessel.

57. (Previously Added) Apparatus according to claim 55 and wherein said at least one temperature sensor comprises at least one temperature sensor associated with a vehicle windshield.

58. (Previously Added) Apparatus according to claim 48 and wherein said heating and fluid discharge controller also has the following functionality for a sequence of fluid heating and discharge cycles:

heating said still further quantity of said fluid to a third target temperature at which temperature the still further quantity of said fluid in said vessel is discharged and a yet further quantity of fluid is supplied to said vessel.

59. (Previously Added) Apparatus according to claim 48 and wherein said second target temperature is lower than said first target temperature.

60. (Previously Added) Apparatus according to claim 48 and wherein said third target temperature is generally the same as said second target temperature.

61. (New) Apparatus for cleaning or de-icing a vehicle window, comprising:

- a reservoir for containing therein a washing fluid;
- a vessel having an inlet through which the washing fluid is received from the reservoir and an outlet through which the fluid is discharged;
- at least one spray head in fluid communication with the outlet through which the fluid is sprayed onto at least one vehicle window;
- at least one windshield wiper for wiping said at least one window; and
- a windshield wiper actuator system including:
 - a motor which actuates said windshield wiper; and
 - a controller operative to control at least one of said at least one spray head and said at least one windshield wiper based on a torque of said motor.

62. (New) Apparatus according to claim 61 wherein:
said windshield wiper is operative to wipe said window between two limits of travel;
said motor is operative to move said at least one windshield wiper in both a clockwise direction and a counterclockwise direction; and
said controller is operative to change the direction of said at least one windshield wiper without reaching at least one of said two limits of travel.

63. (New) Apparatus according to claim 62 wherein said controller is operative to change the direction of said at least one windshield wiper without reaching at least one of said two limits of travel based on said torque.

64. (New) Apparatus according to claim 61 wherein said controller is operative to synchronize operation of said at least one spray head with movement of said at least one windshield wiper.

65. (New) Apparatus according to claim 61, wherein said windshield wiper wipes said window between two limits of travel, and said windshield wiper is placeable in a summer parking mode and a winter parking mode, wherein in said summer parking mode, said wiper is at rest generally at one of the limits of travel, and wherein in said winter parking mode, said wiper is between said limits of travel.

66. (New) Apparatus according to claim 61, and also comprising a heating element

disposed in the vessel for heating the fluid in the vessel.

67. (New) A method for cleaning or de-icing a vehicle window, comprising:
- providing a vehicle including a reservoir for containing therein a washing fluid, a vessel having an inlet through which the washing fluid is received from the reservoir and an outlet through which the fluid is discharged, at least one spray head in fluid communication with the outlet through which the fluid is sprayed onto at least one vehicle window, at least one windshield wiper for wiping said at least one window and a windshield wiper actuator system including a motor which actuates said windshield wiper and a controller operative to control at least one of said at least one spray head and said at least one windshield wiper based on a torque of said motor; and
- controlling at least one of said at least one spray head and said at least one windshield wiper based on a torque of said motor .